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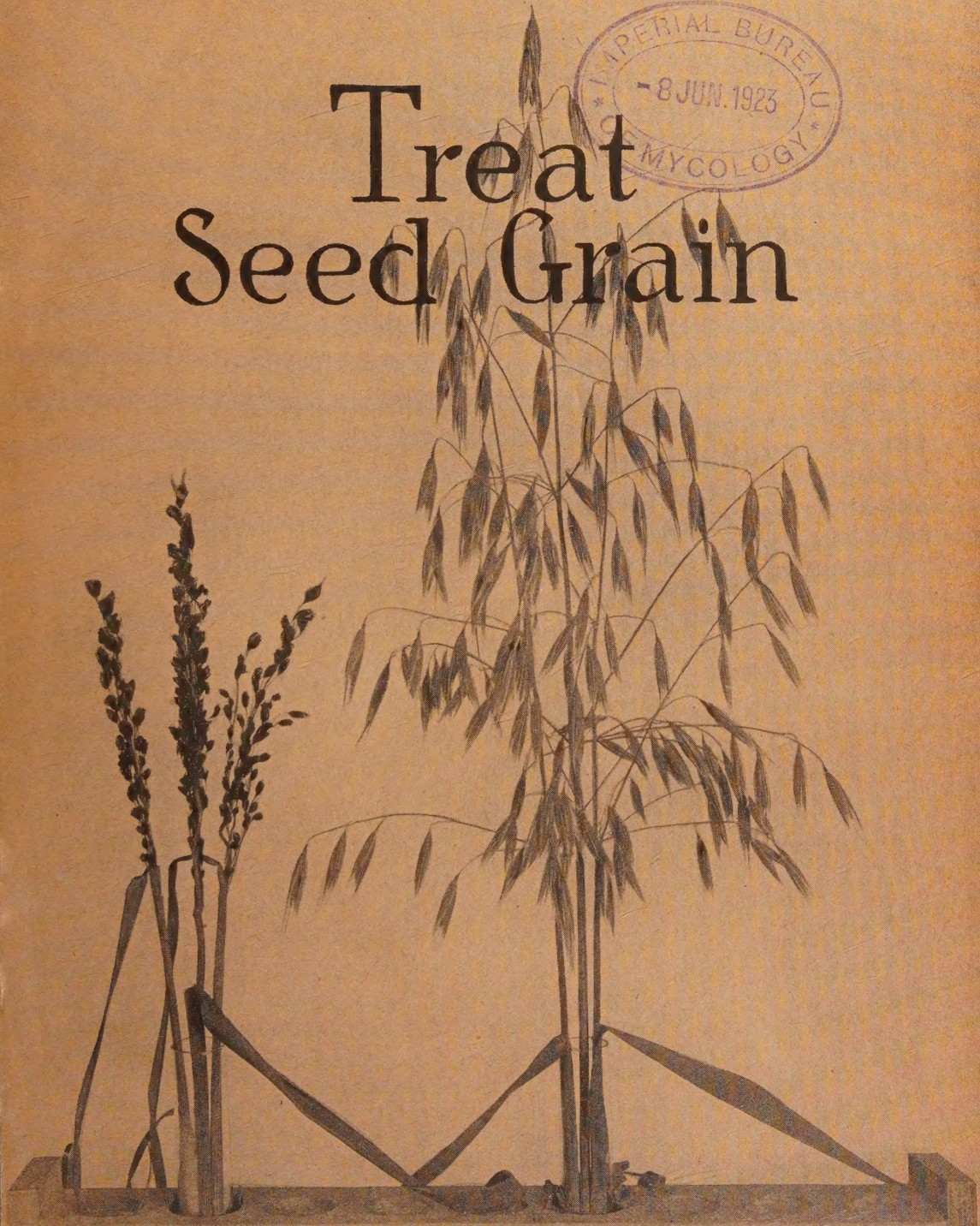

EXTENSION SERVICE OF THE COLLEGE OF AGRICULTURE
THE UNIVERSITY OF WISCONSIN

Treat Seed Grain

R. E. Vaughan and A. G. Johnson

Do you know that Wisconsin farmers lose nearly a million bushels of oats a year through smut, nearly a half million bushels of barley through smut and stripe, and thousands of bushels of wheat and rye from preventable plant diseases? With the present low prices a man cannot afford to throw away the use of so much land as is required to grow these worthless plants—robbers of his profits. Any crop that is worth growing at all is worth growing well; and efforts should be made to reduce so far as possible the annual toll taken by disease.

Treatment Means Insurance

Seed grain may or may not carry smut germs. But treatment is good business and cheap insurance because it takes away one of the hazards on crop losses. If you raised your own seed last year and it was free from smut, it may not be necessary to treat this year; but if there was some smut, even if only a fraction of 1 per cent, then by all means treat. Also, treat any grain whose history of last year is unknown. At the Experiment Station, a few years ago, a sample of highly recommended oats was sent in for trial. Half of this seed was treated with formaldehyde in the smut machine, and half left untreated for check. Result,

SMUT

Spreads with seed
Grows inside plant
Makes black heads
Reduces yield
Lowers quality
Killed by formaldehyde

no smut where the treatment was used and 37 per cent smut where seed was not treated (Fig. 1). It pays to be on the safe side, and the premiums are low.

USE TREATMENT AND SENSE

Seed treatment is not a "cure all." It can never take the place of good soil preparation and drainage and the use of

FIG. 1.—OAT SMUT REDUCES YIELD

Sheaf of oats at right from treated seed, two sheaves at left from untreated seed, 37 per cent of plants smutted in center sheaf.

vigorous strains of seed that have been well cleaned by a good fanning mill. Treated seed also will rot in cold, wet ground just as does untreated seed under the same conditions. It is a fact, however, that since treated seed has taken up some moisture during treatment, germination is more rapid in the

soil and the stand is much more uniform than that from untreated seed, especially under dry conditions. Seed treatment is an operation to be added to good, clean seed and good culture.

LIMITS OF SEED TREATMENT

Seed treatment is without value in the control of grain rusts of both the stem and leaf varieties. Nor is it of value in controlling the net blotch and spot blotch diseases of barley. The loose smut of barley and the barley stripe disease can be checked by using the two-hour soaking method, as in process No. 1.

SEED TREATMENT

The most effective method of treating grain on the farm is the formaldehyde (trade name formalin) seed treatment. While this will not fully control the loose smuts of wheat and barley, it is very effective in controlling the smuts of oats, the covered smut of barley, the bunt or stinking smut of wheat, and the stalk smut of rye. The cost of treatment varies with the labor available and the market price of formaldehyde, but at most it amounts to only a few cents a bushel. Farmers may club together and reduce the cost. The county agents and farm bureaus are always glad to assist in this work.

DIRECTIONS FOR FORMALDEHYDE TREATMENT

The solution used is made up as follows: 1 pint 40 per cent formaldehyde in 30 to 35 gallons of water. The processes may be more or less varied, but those given have been found by experiments to be best suited to Wisconsin conditions. Barrels or tanks are not injured by formaldehyde and may be used for holding the solution when soaking or dipping the seed. The solution may be used several times, but preferably not more than four or five times.

FORMALDEHYDE SOLUTION

Formaldehyde 1 pint
Water 30 gallons
Mix well

CAUTIONS TO BE OBSERVED

1. Always run the seed through a good fanning mill before any treatment is given. This will remove many of the blighted

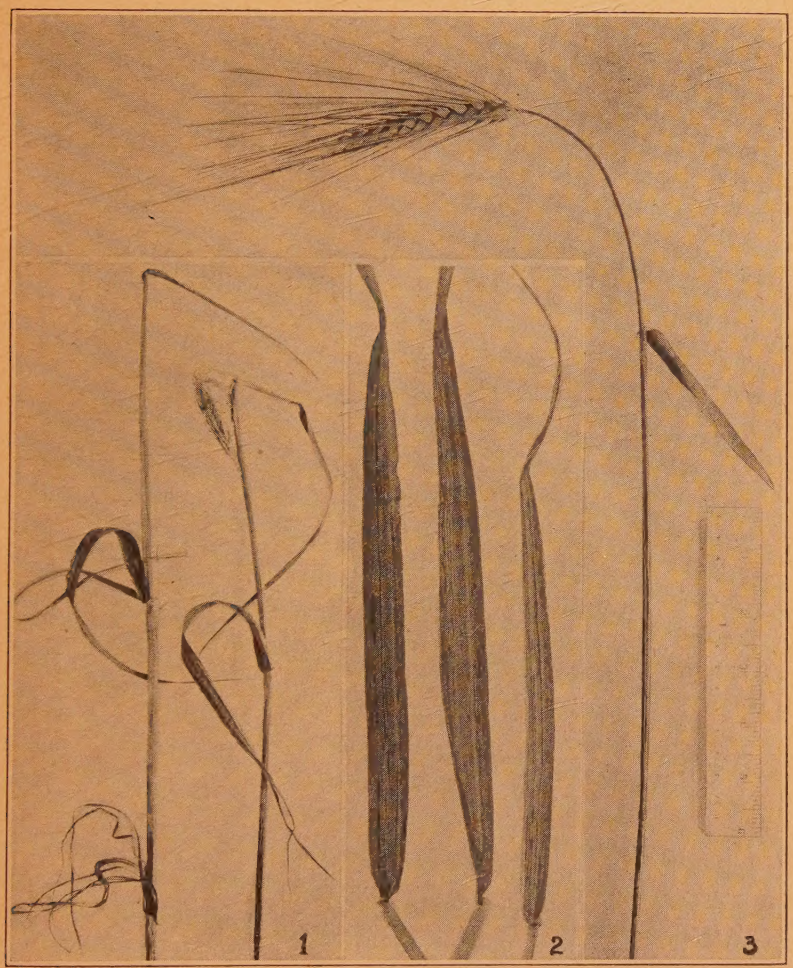

FIG. 2.—BARLEY STRIPE CAN BE CONTROLLED

1. Shattered leaves, dwarfed head with awns tied into seed leaf. Plants frequently die before reaching heading stage. 2. Young leaves show yellowish stripes which later turn brown. 3. Healthy barley plant. Note bending of stalk with weight of grain.

kernels, the spore balls, many of the free smut spores, and dirt.

2. Avoid freezing the wet grain. Freezing would lower or destroy germination.

3. When the seed has been treated and is yet damp and swollen the seeder or drill should be set to sow one-half bushel (barley or wheat) to three-fourths bushel (oats) more to an acre than the usual amount.

PRACTICAL DIRECTIONS FOR SEED TREATMENT

No. 1. Treatment best for barley. One pint 40 per cent formaldehyde to 30 gallons of water, temperature 60° F. Soak the seed in loosely filled burlap or gunny sacks for two hours. Drain on slats over the barrels or tanks to avoid wasting the

FIG. 3.—DRAINING GRAIN AFTER TREATMENT

This method of treatment makes it possible to use the solution several times. Formaldehyde does not injure the barrels or tanks, or spoil them for other purposes.

solution. Dry by spreading on a clean floor or canvas and stirring occasionally with rake or shovel. It will dry faster if the wind can blow over the wet grain. Sow as soon as the seed will run freely, or dry thoroughly and store in clean bags or bins until it is planted. Barley requires a *two-hour* treatment to kill the leaf stripe and loose smut diseases.

No. 2. Treatment best for oats, wheat, and rye. One pint 40 per cent formaldehyde to 35 gallons of water. Dip the seed, in loosely filled burlap or gunny sacks, into the solution and soak for *five minutes.* Drain and pile the grain on a clean floor or canvas and cover with sacks of canvas for two hours. This covering is important as it prevents too rapid evapora-

tion of the formaldehyde. It is difficult to dry oats if long treatment is applied. Dry and handle as in Treatment 1.

No. 3. Treatment sometimes used for oats, wheat, and rye, but not recommended when Treatment No. 2 can be used. One pint 40 per cent formaldehyde to 35 gallons of water. Sprinkle the solution on the seed, using about one gallon to the bushel, shoveling over at the same time to make sure of thorough and uniform wetting. Cover in a pile of clean bags

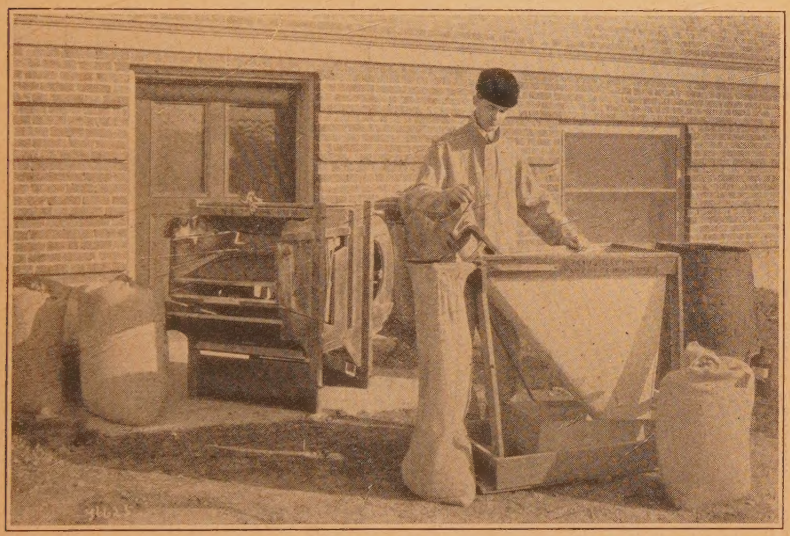

FIG. 4.—MACHINE TREATMENT FOR OAT SMUT

This method of applying formaldehyde solution is also satisfactory for the control of bunt in wheat, covered smut in barley and smut in rye. Use the fanning mill before treating to remove light seed, weeds and chaff.

or canvas and handle as in Treatment 2. The effectiveness of this treatment depends upon the thoroughness of wetting and care in covering. If any part of the seed is left dry the smut may live.

No. 4. Dry method recently introduced for oats. One pint 40 per cent formaldehyde to one pint of water. Put this solution in a quart atomizer or hand sprayer, and spray onto the grain while it is being shoveled over on a clean floor or canvas, holding the atomizer close to the grain. One quart is enough for 40 to 50 bushels of oats. Then pile and cover for 5 hours. There is no danger from freezing or heating,

and because the grain is not swollen there is no need to increase the amount to be seeded.

No. 5. Smut machine treatment is satisfactory for oats, wheat, and rye. There are several machines on the market which have mechanical devices for carrying the grain into the dilute (1–35) formaldehyde solution and then into bags. The bags should be tied tightly and covered up with a blanket for a few hours to get the full benefit of the formaldehyde. Dry and handle as in Treatment 1. Oats will dry out well enough to be sown the next day if the sacks are allowed to stand so that they do not touch one another. Otherwise, dry and handle as in treatment 1.

USE FORMALDEHYDE

The two-hour soaking method is best for barley. It gets the stripe and covered smut and greatly reduces loose smut—1 pint to 30 gallons water.

Five minutes is best for oats, wheat, and rye—1 pint to 35 gallons.

Use sprinkling can to apply solution if you do not have tanks or barrels for dipping—same strength as in No. 2.

A hand atomizer or sprayer may be used with formaldehyde and water half and half.

Smut treating machines are on the market, and many are giving good accounts of themselves.

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